Method and Apparatus for the Controlled Conditioning of Scanning Probes

Abstract

The present invention concerns the fabrication, reshaping, and repair of scanning probes (SPs), which are the most essential part of any scanning probe microscope (SPM). This is effected by controlled, possibly multi-stage chemical reactions between an SP surface and a reactive medium, which reactions, by appropriate selection and matching of chemicals to the material to be treated at the SP, and by appropriate control of the contact area and, eventually, of other parameters that govern the progress of the reactions such as the electrical environment, results in deposition, removal, or modification of material at well-defined regions on the surface of the SP, in particular at the very tip of the SP, e.g. as desired for aperture SPs (ASPs) used in scanning near field optical microscopes (SNOMs). The chemical reactions may preferably be electrolytic ones and/or performed while the SP is mounted in the SPM. The latter even enables repair of a damaged SP in situ.

(Fig. 1a)